10/507420
PCT/AU03/00307
09 AUG 2004

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN COMPLIANCE WITH RULE 17.1(a) OR (b)

Patent Office
Canberra

I, SMILJA DRAGOSAVLJEVIC, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PS 1063 for a patent by IAN MCROBERT as filed on 13 March 2002.

COMMONWEALTH OF AUSTRALIA
AUSTRALIA
PATENT OFFICE

WITNESS my hand this
Twenty-fifth day of March 2003

S. Dragosavljevic

SMILJA DRAGOSAVLJEVIC
TEAM LEADER EXAMINATION
SUPPORT AND SALES

APPLICANT: Ian McROBERT

NUMBER:

FILING DATE:

AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:

"WASTE EXTRACTION SYSTEM"

The invention is described in the following statement:-

Waste Extraction System

Field of the Invention

The present invention relates to a waste extraction system for aquaculture receptacles such as tanks and ponds.

Background of the Invention

When breeding marine organisms in tanks or ponds it is necessary to ensure good water quality to promote growth and good health of the marine animals. To this end, the water within an aquaculture tank or pond is typically circulated through a filter to extract solid particles and other waste material. In its simplest form, this is achieved by plumbing an outlet pipe to the tank or pond which is coupled to a pump and filter so that water from the tank or pond can be drawn through the outlet pipe and through the filter. The filtered water can then be returned to that particular tank or pond or to another tank or pond.

Lunde et al in US 5,636,595 teaches a device for removing sediment particles from water in aquaculture tanks which includes a chamber within a tank that acts as a particle trap and having one conduit for drawing off water and another for drawing off the particles, both conduits feeding from the chamber.

While the *Lunde* system can be retrofitted to existing tanks, it appears that the preferred option is to form the chambers of the device integrally with the tank. This requires plumbing to the undersurface of a bottom wall of the tank. A further potential downside is that the chamber may eventually fill with particles and require separate cleaning.

Object of the Invention

It is an object of the present invention to provide an alternate system for extracting

waste from aquaculture receptacles, and in particular, a system which does not require plumbing to an undersurface of a bottom wall of an aquaculture receptacle.

Summary of the Invention

According to the present invention there is provided a waste extraction system for an aquaculture receptacle having a side wall and a bottom wall, said receptacle having a water level maintained at a pre-determined level, said system including at least:

a first conduit having first and second ends;

a second conduit disposed inside said first conduit, said second conduit having first and second ends;

a plate extending transversely across said first end of said first conduit and laterally of said first conduit, said plate provided with an axial hole in fluid communication with said first end of said second conduit, and said first end of said first conduit provided with at least one aperture near said plate; and,

spacer means on a surface of said plate opposite said first conduit for spacing said plate from said bottom wall;

said first and second conduits configured to exit said tank at a location at least partially below said pre-determined water level.

Preferably said system includes: a sleeve about a length of said first conduit, said sleeve having a first end above said at least one aperture and a second end above said first end of said sleeve; and,

a hose for supplying a gas to said first end of said sleeve.

Preferably said first conduit includes an opening between its first and second ends, said

opening disposed above said pre-determined level.

Preferably each of said first and second conduits include a first length that contains the respective first ends of said conduits, and extends generally vertically; and,

a second length that extends generally horizontally, said second length disposed at least partially below said pre-determined level.

Brief Description of the Drawings

An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure1 is a schematic representation of an embodiment of the waste extraction system;

Figure 2 is an enlarged view of a bottom portion of the system shown in Figure 1;

Figure 3 is a partial perspective view of the bottom portion depicted in Figure 2;

Figure 4 is a side view of a second embodiment of the system; and,

Figure 5 is a representation of an aquaculture tank in which the system can be used.

Detailed Description of Preferred Embodiments

Figure 1 illustrates an embodiment of the waste extraction system 10 for an aquaculture receptacle such as a tank 12. The tank 12 has a circumferential side wall 14 and a bottom wall 16. The system 10 includes a first conduit 18 having the first end 20 and a distant second end (not shown). Inside the conduit 18 is a second conduit 22. The second conduit 22 has a first end 24 which is substantially co-terminus with the end 20. A plate 26 extends transversely across the first end 20 and also laterally of the first conduit 18. An axial hole 28 (see Figure 3) is formed in the plate 26 to provide a fluid

communication with the second conduit 22. Thus, the plate 26 in effect closes off the end 20 of the conduit 18. Spacer means in the form of axially extending legs 30 are formed on an undersurface of the plate 26 to space the plate 26 from the bottom wall 16 of the tank 14. As explained in greater detail below, this creates a collection region 32 for solid particles. At last one aperture 34 (in this instance, 3 shown) is formed in the conduit 18 near the end 20 to allow water to flow in a flow chamber 36 formed between an inner surface of the conduit 18 and outer surface of the conduit 22. The conduits 18 and 22 exit the tank 14 at a location 38 which is at least partially below a predetermined water level 40 (see in particular Figure 4) maintained within the tank 12.

Typically, the system 10 is disposed within a tank 12 in which is created a circular flow of water as depicted in Figure 5. This flow of water can be generated by having a water inlet manifold or pipe 42 with one or more outlets 44 for directing incoming water to flow tangentially to the inside surface of the wall 14 thereby creating a circular flow or vortex of water within the tank 12. As a result of the circulating flow of water any particulate matter including faeces and food is drawn to the axis of rotation of the water flow. Typically, when the tank 12 is a circular tank, this axis will be the central axis of the tank itself. By placing the system 10 at a position so that the ends 20 and 24 are in general alignment with the axis, the particulate material tends to collect on the bottom wall 16 beneath the plate 26. By continually pumping water into the tank 12 while maintaining the water level 40, water is drawn from above the plate 26 through the apertures 34 and the flow chamber 36 out of the tank at exit point 38. This water in effect flows by action of gravity through the flow chamber 36 and can be passed through a filter. The solid particulate matter 44 is caused to move by action of the circulating water (which applies a centripetal force on the matter 44) into the collection region 32 beneath the plate 26 where it is entrained in water and flows up through the axial hole 28 into the conduit 22 and out of the tank 12. This matter may be diverted to a settling pond, sludge tank or other processing unit. To this end, the second conduit 22 may pass through a sealed hole 45 formed in the conduit 18 outside of the tank 12.

As shown in particular in Figures 2 and 4, the conduit18 is provided with an opening 46 between its first end 20 and second end above the water level 40. The opening 46

provides an overflow drain in the event of malfunction in the water level control system so that the water level within the tank 12 cannot substantially exceed the height of the opening 46. The opening 46 also opens the conduit 18 to air pressure to prevent the siphoning of water from the tank 14.

To further assist in drawing water through the conduit 18 and solid matter through the conduit 22, an airlift arrangement 48 may be provided. The airlift arrangement 48 includes a sleeve 50 extending about a length of the conduit 18. The sleeve 50 has a lower end 52 disposed above the apertures 34 and an opposite end 54 above the first end 52. The airlift 48 also includes a hose 56 for supplying gas (typically air) to an annular distributor 58 provided at the end 52 of the sleeve 50. When air is pumped through the hose 56, the air exits through the distributor 58 and flows upwardly between the sleeve 50 and the conduit 18 inducing a general uplift or flow of water, assisting in the drawing of water through conduits 18 and 22.

In the illustrated embodiment, the conduits 18 and 22 are provided with generally vertically extending lengths 60 and 62 respectively and respective second lengths 64 and 66 which extend generally horizontally. The horizontal lengths 64 and 66 are disposed at least partially below the water level 40.

The present system 10 can be easily retrofitted to existing aquaculture tanks 12 and can be easily lifted out of the tank either manually or by use of simple hoists to allow the performance of various tasks such as cleaning of tank 14 or grading of marine animals. There is no need to physically plumb pipes beneath the bottom wall 16. Further, thereis no recess or chamber in which particulate material can build up. Further, the flow of water and solids through the conduits 18 and 22 is achieved by the combined effects of gravity and pumping fresh water into the tank. There is no need to plumb the conduits 18 and 22 to a pump in order to draw water from the tank 12.

Now that an embodiment of the present invention has been described it will be obvious to persons of ordinary skill in the art that numerous modifications and variations may be made without departing from the basic inventive concepts. For example, the airlift

system 48 aids in the functioning of the extraction system 10 but is not an absolute requirement and can be dispensed with. Further, while the plate 26 is depicted as being circular, it may be in the form of other shapes. Further, it is not a requirement for the conduit 22 to be held co-axially within the conduit 18.

All such modifications and variations are deemed to be within the scope of the present invention the nature of which is to be determined form the above description.

Dated this 13th day of March 2002

Ian McROBERT
By Its Patent Attorneys
GRIFFITH HACK

Fellows Institute of Patent and Trade Mark
Attorneys of Australia

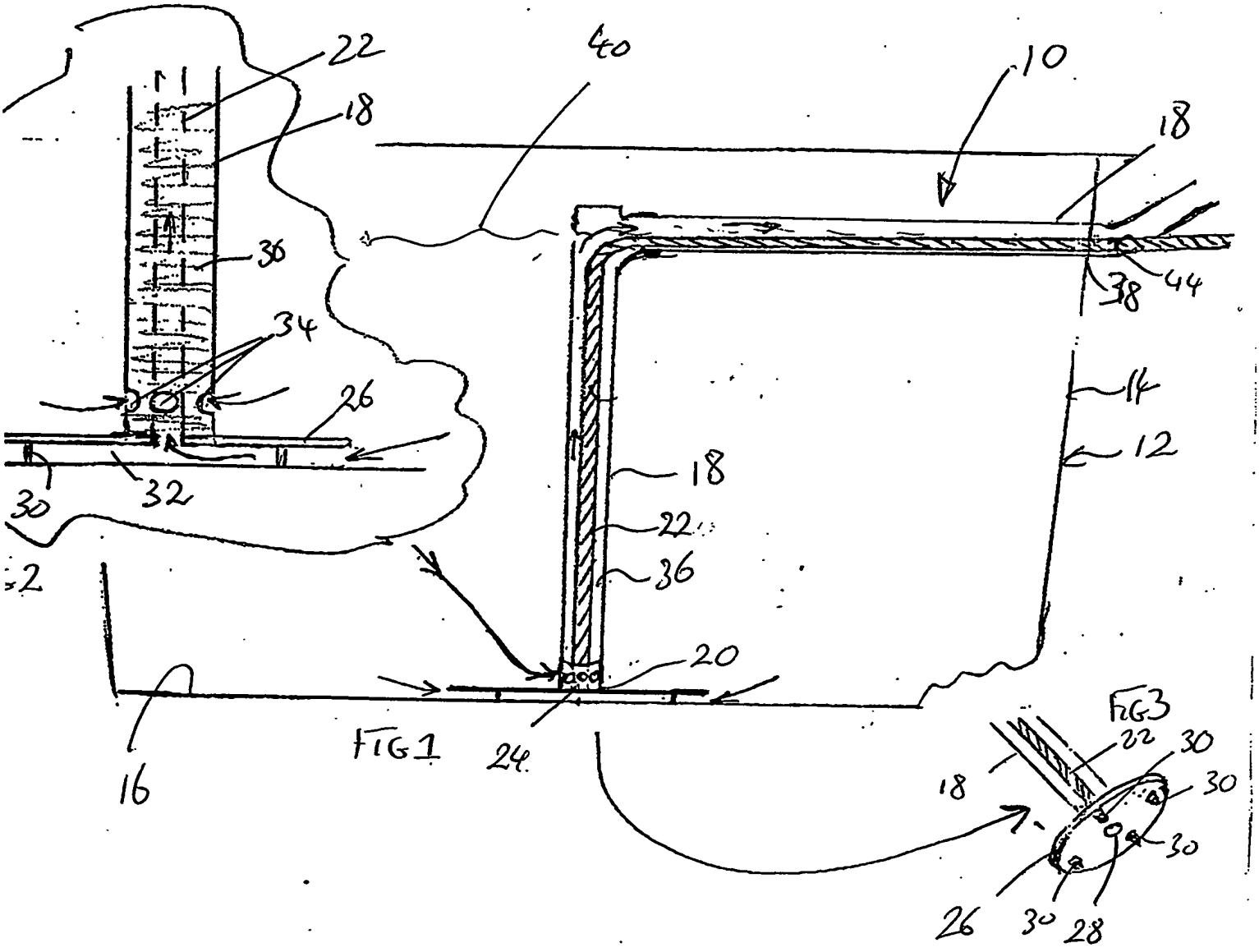
22
18
40
10
18
36
34
38
44
26
14
30
32
18
12
22
36
20
16
24

FIG 1

22
30
18
30
30
26
30
28

FIG 3

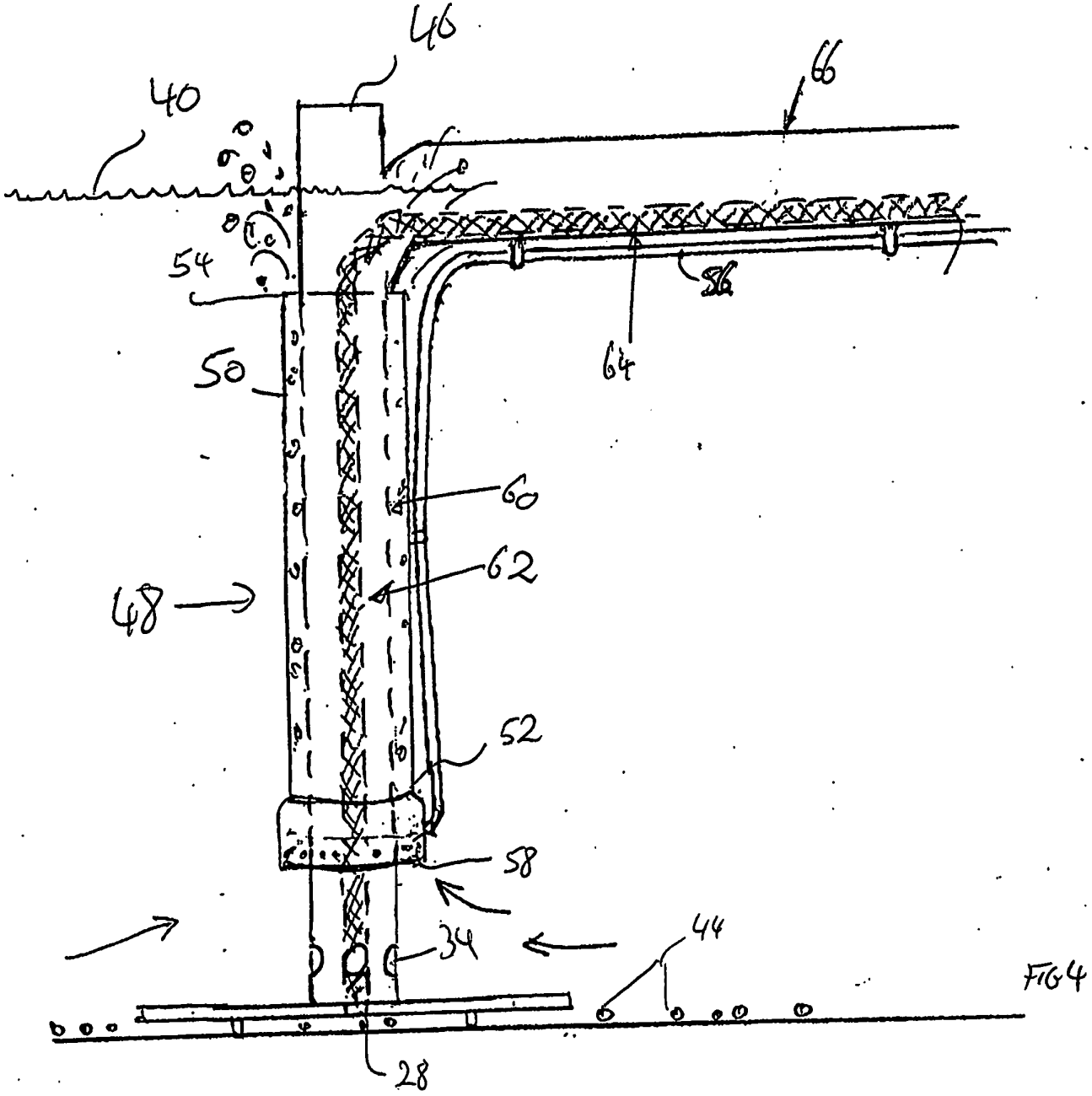

FIG 4

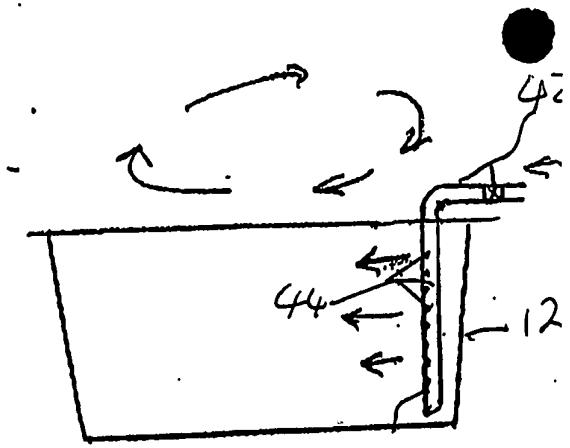

FIG 5